

# North Anna River Watershed – Fact Sheet

**Location** The 70-mile-long North Anna River rises in the Piedmont region, near the town of Gordonsville, in Orange County and flows primarily southeast into 17 mile-long Lake Anna. Formed by the North Anna Dam, near Bumpass, the 13,000 acre lake is comprised of a 9600 acre reservoir and a 3400 acre waste heat treatment facility for the North Anna Nuclear Power Plant. The North Anna River then continues southeast until it is joined by the South Anna River five miles northeast of the town of Ashland, and forms the Pamunkey River. Near its mouth, the North Anna River also collects the Little River. The river's course forms most of the southern boundaries of Orange, Spotsylvania and Caroline Counties and the northern boundaries of Louisa and Hanover Counties.

---

**Land Use** Although the upper watershed of the North Anna River has a high volume of impounded water, the surrounding landscape retains its rural quality. The predominant land uses are forestry and agriculture in Orange and Louisa Counties, as well as the portion of Spotsylvania County lying within this watershed. Pine forests produce building timbers, plywood and paper pulp. Major agricultural products include greenhouse plants, beef cattle, grain crops, and vineyard/wineries. Although agricultural sales are up slightly, the number and size of farms in Spotsylvania and Louisa Counties is declining.

Located on a 1075-acre site in Louisa County, North Anna Nuclear Power Plant is owned by Dominion Virginia Power corporation and the Old Dominion Electric Cooperative. It generates 1786 megawatts from two units (reactors), enough electricity to power 450,000 homes, mainly in the greater Richmond area and Northern Virginia. Unit 1 began commercial operation in June 1978 and unit 2 followed in December 1980. Lake Anna is also used for recreational purposes including boating, fishing and swimming. Located on the north shore, 2810 acre Lake Anna State Park is typically visited by 150,000 people annually. The lake is also surrounded by several residential developments, campgrounds and marinas.

Sections of the North Anna River Watershed are growing rapidly. During the next decade, the growth rate in the North Anna River watershed portions of Louisa and Orange Counties are expected to greatly exceed surrounding areas. Orange County's watershed portion contains the Routes 15 and 20 growth corridors between Gordonsville and to the east of the town of Orange. The lower watershed contains the busy Interstate 95 corridor.

---

**Historical Significance** One of the northwestern most ridges dividing the York (North Anna) and Rappahannock River watersheds is located within James Madison's Montpelier. The fourth U.S. President and principal author of the United States Constitution and one of the most amiable and influential first ladies in U.S. history, spent most of their adult lives there. Today's interpretive programs at Montpelier focus not only on the political contributions of the Madisons, but the lives of the enslaved community and the natural history of the region.

For nearly a century, from 1830-1920, the Louisa County portion of the North Anna watershed was an active center for industrial mining. Part of the Gold-Pyrite Belt of Virginia, the area was also known for the production of iron and cooper. As one local historian puts it "ours is the nitty gritty story of industrial labor, the role of slaves, post-bellum class relations and technological change." Pyrite was mined for the production of sulfuric acid which was used for a variety of industrial processes. Water flowing through fractures in sulfide rich rocks and mine tailings led to acid drainage in nearby streams, a situation that continues today. Local residents supported major war efforts through mineral

procurement as late as World War I, when rail lines were put in transport locally mined lead and zinc used to manufacture ammunition.

During the Civil War, the region experienced a great deal of movement amongst civilians and the Union and Confederate armies. Confederate soldiers were treated at the Exchange Hotel hospital in Gordonsville. Residents of nearby communities often evacuated (when the Union Army took control of their towns) and spent months at a time as refugees in the town of Orange. Thousands of soldiers camped in the area each winter, often with only one of the region's small rivers separating them. Photographs taken at the time show large tracts of deforested land.

The Battle of North Anna followed the battles at Wilderness and Spotsylvania Courthouse in May 1864. This month marked a shift in tactics for the Army of the Potomac under its new commander General Ulysses S. Grant. Instead of staying put or retreating, even after a victory, the Union Army kept pushing toward the Confederate Capital of Richmond. After two weeks of extensive fighting, General Robert E. Lee's Army of Northern Virginia was driven to the banks of the North Anna River near Jericho Mills. For two days, they faced one another across miles of formidable earthworks, among the best preserved to this day. Each side suffered approximately 2000 casualties. In the end, the Battle of North Anna River was significant not so much for what happened but what didn't. Though he hindered Grant's thrust toward Richmond, Lee lost his last chance of defeating the Union Army when he became ill and could not give orders at a critical juncture. Grant mistook Lee's apathy on the North Anna as a sign of demoralization among the Confederates and became convinced that one final blow would shatter the Rebel army. The tragic battle at Cold Harbor would soon follow.

---

## Natural Features

Rich in habitat, the North Anna River watershed is home to a wide range of wildlife characteristic of the Virginia Piedmont including wild turkey, white-tail deer, raccoons, opossum, red and gray fox, black bear, bobcat, beaver, river otter, eastern cottontail, gray squirrels, box turtles, black snakes, red bellied salamanders, blue herons, eastern bluebirds, bald eagles, red tailed hawks, vultures, bobwhite quail and numerous others. Loblolly pine is a predominate tree species however, riparian areas would also include red maple, green ash, river birch, paw paw, sassafras, white dogwood, redbud, sycamore, black oak, Virginia pine, American beech and shortleaf pine.

Lake Anna is a top largemouth bass fishing destination for anglers residing in central and northern Virginia. Despite the intensive fishing pressure, the reservoir maintains very high catch rates and good numbers of bass in the four to six pound range. Other popular game fish include black crappie, channel catfish and white perch. Striped bass, which are maintained by annual stocking, grow well in Lake Anna for the first few years. However, growth of older fish slows due to the lack of good striped bass habitat (cool, well oxygenated water). Routine population sampling is conducted by fisheries biologists from the Department of Game and Inland Fisheries.

---

## Water Quality

In some ways water quality conditions in the North Anna watershed are what would be expected for a primarily rural landscape, with streams continuing to support a healthy diversity of aquatic life. However, there are several problematic areas where streams have been placed on the state and federal Impaired Waters lists. Contrary Creek in Louisa County is arguably the worse acid mine drainage site in Virginia, receiving discharges from five abandoned pyrite mines. Typical pH levels for this perennial stream average 3.5. Nearby groundwater seeps by contrast average 6.0 – 6.5 pH levels. A persistent red slime typically covers the stream bottom. Several heavy metals are also present including cadmium, copper, lead and zinc.

Mercury has been found in fish tissue from Lake Gordonsville and fish from Lake Anna have contained PCB. Several stretches of the Little River are impaired for varying reasons including E coli, dissolved oxygen and pH. Portions of the main stem of the North Anna are listed for E coli and unhealthy benthic macroinvertebrate populations.

Natural resource professionals working in the field note substantial erosion and sedimentation of streams due to agriculture and residential/commercial development. Fencing livestock out of streams, reforesting riparian buffers and encouraging local governments to adopt and adhere to comprehensive development plans which protect sensitive areas and are among the goals of several state and federal programs.

---

## Other Environmental Issues

In addition to the mine drainage at Contrary Creek, perhaps the most notable ongoing environmental issue in this watershed involves the future operations of the North Anna Nuclear Power plant. Since the time it was first proposed, numerous studies by both Dominion Power and regulatory agencies have shown that the aquatic life has not been harmed by plant operations. Hundreds of recreational anglers would no doubt support this view. However, numerous environmental groups, such as the Sierra Club and People's Alliance for Clean Energy, as well as some local residents are not so inclined. North Anna is currently going through the lengthy process of obtaining permission from the Nuclear Regulatory Commission to build an additional reactor on site to meet growing demand.

According to the Nuclear Energy Institute, North Anna is one of the best run plants in the country and adds \$700 million to Virginia's economy. North Anna's two reactors generate more than 15 billion kilowatt-hours of electricity per year, providing about one-fifth of the electricity produced in the state. Dominion Power is the area's largest employer. The plant's overall efficiency helps keep power costs and local taxes down. Central to all arguments against nuclear power are ongoing problems associated with the disposal of nuclear wastes. Additional negative points include substantial increases in water use resulting in lower lake levels, increases in warm water discharges containing chemicals, heavy metals and biocides and inadequate emergency and other plans according to opponents.

Of great concern to foresters and biologists is the spread of the Emerald Ash Borer. Although it has only been found in a few locations in Northern Virginia, this pest has the ability to spread quickly via firewood/wood transportation. Once established, it has the potential to eliminate all ash species from the regional ecosystem. If that were to occur, an important economic as well as riparian tree species that plays a key role in erosion control and pollution uptake would be lost.

Continued development pressure on Civil War battlefields and other undeveloped lands in the region has both cultural and environmental implications.

# York River Watershed – Fact Sheet

**Location** The York River watershed covers 2662 square miles (approximately 7% of the land base of Virginia) and includes the drainage basins of its two major tributaries, the Pamunkey and Mattaponi Rivers. It is bound to the north and east by the Rappahannock River basin and to the south and west by the James River basin. These hydrologic boundaries are also referred to as the Tidewater (or Lower) and Middle Peninsulas of Virginia. All or a portion of the following twelve counties lie within the York River basin: Albemarle, Caroline, Gloucester, Goochland, Hanover, James City, King and Queen, King William, Louisa, New Kent, Spotsylvania and York.

The headwaters of the York River begin in Orange County and flow in a southeasterly direction for approximately 220 miles to its mouth at the Chesapeake Bay. Basin width narrows from 40 miles at the headwaters to five miles at the mouth. Lying in the Piedmont and Coastal Plain physiographic provinces, the basin's topography is characterized by slightly rolling hills at the headwaters or extreme western portion, to gently sloping hills and flat land near its mouth. The York River itself, which is formed by the confluence of the Pamunkey and Mattaponi Rivers in West Point, is about 36 miles in length and tidal throughout. Its waters comprise a biologically and economically significant estuary with both state and federal recognition. Also of major importance are the extensive tidal and fresh-water wetlands located in the middle and lower reaches of the system.

---

**Land Use** The 2006 population for the York River basin was approximately 310,000 people, with the majority of those being evenly distributed rural residents. West Point, Gloucester Point, Yorktown and a portion of the city of Williamsburg are the most densely populated areas of the basin. Although the smallest in geographic size of the Chesapeake Bay's major tributaries in Virginia, the York River basin is among the fastest growing. A 21.4 % increase in population was predicted from 2000-2020. Most recent land use categories are estimated to be 63% forest, 20% agriculture and 10% urban. Approximately 7% of the land base in the basin is comprised of wetlands. Despite the expected increase in population, this general land use mix is expected to continue with the exception of a slight decrease in agriculture and increase in urbanization.

Historically speaking, land uses have included mining in the upper watershed and the production of pulp, paper and other forest products in the mid section of the basin. For nearly 100 years, there has been a large paper mill in West Point. The current operators, Smurfit-Stone, produce boxes and corrugated medium using a variety of recycled materials. The energy industry is also active in the York River watershed. Dominion Power operates the North Anna Nuclear Power station on the impounded waters of Lake Anna in Louisa County. Far down stream in York County, Western oil refinery processes 70,000 barrels of crude oil a day which arrives on barges originating from sources across the globe. Virginia Electric Power Company operates a coal burning power plant in Yorktown. Several military installations are also located along this section of the York River.

Whether or not a particular river was navigable played an important role in its colonization by European settlers. With an average depth of 83 feet, the York River at Yorktown afforded the best natural harbor in the state for large vessels. Thus, shipping and shipbuilding are also long term industries in the lower York basin. Commercial vessels on the York River move pulpwood, grain, fuel and other products. Both fin and shellfish are harvested from this productive waterway.

Fertile soil, relatively flat land and proximity to ports, rail terminals and regional grain storage facilities have enabled York River basin farmers to become state leaders in the production of row crops. In addition to traditional crops such as corn, soybeans and wheat, regional farmers are growing more

barley for ethanol production. To serve the growing residential population, large greenhouses and nurseries have been established. Small fruit production (berries) and other fresh produce for farmer's markets are also an important part of the agricultural profile. Reportedly, an increasing number of farmers are using no or low till cultivation methods to help prevent soil erosion.

Due to the abundance of water and presence of historical sites and amusement parks, the York River basin supports a healthy tourist industry. Every summer there is an influx of vacationers looking to enjoy the York's many recreational opportunities including kayaking, boating and fishing.

---

## Historical Significance

Native people first named the river "Pamunkee" to reflect the high ground along the river's shores. "Pam" means sloping and "anki" means upland. At the time of European contact, Tidewater Virginia was not the wilderness often portrayed by history books and the popular press. An estimated 20,000 Algonquian speaking people organized in chiefdoms and independent tribes inhabited the region. According to the Virginia Indian Heritage Program, a sophisticated agricultural and landscape management system was in place, as well as an extensive trade network reaching thousands of miles. The rivers and waterways always played a major role in both the day to day life of the people and the larger religious, cultural and economic systems to which they belonged.

Members of the Mattaponi tribe live on one of the oldest reservations in the country. Dating back to 1658, it stretches along the borders of the Mattaponi River in King William County. The tribe, traces its history back to paramount Chief Powhatan, father of Pocahontas. Approximately 30 Pamunkey Indian families reside on a reservation on the Pamunkey River, also adjacent to King William County. Pamunkey chief, Opechancanough, succeeded Powhatan as paramount chief shortly after Powhatan's death. Modern Pamunkey Indians are descended from both leaders' people. All Americans enjoy certain rights and freedoms related to military service, marriage and education due to the efforts of members of these tribes.

English colonists renamed the main stem river to the Charles and then the York, in 1634 to honor Charles I, the Duke of York. In 1691, the town of Yorktown was established at the river's deepest point. With its protected, deep waters the town served as a bustling harbor. Boats traveled the river carrying tobacco and other products between England and Virginia's plantations. The American victory at Yorktown which ended the Revolutionary War was assured by a naval blockade that stretched from Yorktown to the mouth of the Chesapeake Bay. French Admiral Compte de Grasse's fleet prevented a British escape by sea while General Washington's army surrounded them. The Yorktown battlefields are part of the National Park system.

Yorktown and points upriver also figured prominently in the Civil War, particularly during the Peninsular Campaign of 1862. Confederate defensive lines at Yorktown were one of the first of many obstacles that plagued the Union Army in their earliest attempt to take Richmond. Miscalculations, indecision and swampy conditions between their headquarters near the York River and Richmond, all contributed to the eventual Union retreat. The upper York basin was the site of considerable Civil War action as well, including the Battle of North Anna in 1864 which preceded the battles of Cold Harbor, Petersburg and the eventual fall of the Confederate Capital.

---

## Natural Features

The York, Pamunkey and Mattaponi Rivers are included in the Virginia Scenic Rivers system in recognition of their outstanding scenic, recreational, historical and natural characteristics. The Mattaponi and Pamunkey rivers comprise what is considered to be the most pristine freshwater complex on the Atlantic coast. Largemouth bass, chain pickerel, catfish, striped bass, shad and white perch thrive because of the freshwater marshes that provide food, shelter and nursery grounds for

their young. The spartinas in the upper York serve as nursery ground for drum and menhaden, the most commercially valuable finfish. The York supports additional harvested fish such as bluefish, croaker and flounder and although declining recently, blue crab and oysters.

The York River system is also home to beaver, muskrat and otter. Marsh plants including, wild rice, giant cordgrass, narrow leaved cattails and pickerel weed, provide food for both migrating waterfowl and year round residents such as herons, bald eagles and egrets. Oyster reefs, seagrass beds, tidal wetlands, sand shoals and mudflats are among the diverse habitat provided.

---

## Water Quality

Since its inception in the early 1980s, the Chesapeake Bay Program has identified an over abundance of nutrients as the most damaging water quality problem facing the Bay and its tributaries. According to the Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy for the York River and Lower York Coastal Basins published in 2005, approximately 85% of the nitrogen and 81% of the phosphorous loads to the tidal York River originate from nonpoint sources. Most nonpoint source pollutants run off from agricultural lands, residential and urban areas. The remaining 15% of the nitrogen and 19% of the phosphorous loads come from point source discharges (municipal sewage and industrial wastewater plants). Soil erosion is considered to be 100% nonpoint source related. It comes mainly from construction sites and stream banks. Water quality impacts from excessive inputs of nutrients and sediment include periodic low levels of dissolved oxygen near the mouth of the York and diminished acreage and health of underwater grasses throughout the tidal portion of the river. In terms of phosphorus levels, Virginia has been shown to possess some of the poorest conditions when compared to Bay wide testing. These include a portion of the Mattaponi and the tidal fresh section of the York. Most of Virginia's portion of the Bay watershed is showing improving trends in nitrogen, with a few exceptions such as a degrading trend seen in the lower Pamunkey. Status of nitrogen in much of the York River is considered relatively good.

Chlorophyll tests measure the algal biomass in the water. High levels are an indicator of poor water quality because they can lead to low dissolved oxygen conditions when the organic material sinks into bottom waters and is decomposed. Parts of all of the major Virginia tributaries including the York, have poor status in relation to Bay-wide conditions. A degrading trend in chlorophyll was detected in the lower reaches of the Mattaponi and Pamunkey Rivers, as well as the main stem York.

Water clarity status of many segments within the tributaries and the Bay is fair to poor. This is evident in the York basin, with fair status in the Mattaponi and Pamunkey Rivers and poor status along the York River. Possible causes of the degrading trends include increased shoreline erosion as a result of waterside development, loss of wetlands, increased abundance of phytoplankton and sea rise. Approximately 321 miles of stream and rivers, 17 miles of estuaries and 2512 acres of lakes in the York River watershed are listed as impaired by Virginia Department of Environmental Quality. Sources of impairment include: nutrient pollution, bacteria, mercury, chloride and PCBs (polychlorinated biphenyl).

---

## Other Environmental Issues

Numerous fish consumption advisories are listed by the Virginia Department of Health for waters throughout the York River basin including Lake Anna, Mattaponi River and the main stem York. High levels of mercury and PCBs are the most common concerns. Both of these water pollutants are the result of various industrial processes, although air deposition may be involved so exact sources can be difficult to determine.

Perhaps the most well known environmental related issue in the York River watershed is the 22 year effort to prevent the establishment of the King William Reservoir purposed by the City of



Newport News. After years of various points in the approval process being challenged in court, the city recently withdrew its proposal. Opponents, which included citizen groups, environmental organizations and Native American tribes, believed an impoundment of that magnitude would have caused irreversible damage to the Mattaponi River system, its habitat and fisheries.

Another long term controversy in the York basin involves the proposed construction of additional reactors at the North Anna Nuclear Power Station.

# James River Watershed – Fact Sheet

## Location

The James River forms at the confluence of the Jackson and Cowpasture Rivers in Botetourt County in Virginia's Alleghany Highlands region. After flowing 228 miles to the dramatic Fall Line in Richmond, it continues another 111 miles to the Chesapeake Bay. This 339-mile long journey carries with it a rich tradition of history, scenic beauty and abundant natural resources.

The upper reaches of the James, part of which have been declared as the Upper James Scenic River by the Virginia General Assembly, reveal one of the premier stream fisheries and some of the most dramatic mountain vistas to be found anywhere in the Commonwealth.

The fall line of the James River occurs in the City of Richmond. Over the course of seven miles, the river drops 105 feet in elevation. Below the falls, where the tidal portion of the James begins, the river becomes wide and sluggish. The James River eventually merges with the Elizabeth River in the Hampton Roads area before entering the Chesapeake Bay.

Major tributaries of the James include the Rivanna River which enters at Point of Fork, near Columbia in Fluvanna County, the Appomattox River which joins near the city of Hopewell and the Chickahominy River which enters the James south of Rustic in Charles City County.

---

## Land Use

The waters of the James have shaped life in Virginia's past and will shape its future. Monacan Indians, the earliest known settlers, hunted, fished and traveled the river. Today more than two million people live in the 10,236 square mile area of the James River Watershed which is comprised of urban, agriculture, forested, open water and wetland areas. Major land uses in the rural Upper James are agriculture, forestry and some urban development. Predominant land uses in the Middle James portion of the watershed are forestry and agriculture with more industrial and municipal wastewater treatment facilities emptying into the river than in the Upper James. The more densely populated Lower James watershed is characterized by urban/suburban land uses with less forested cover than the Middle and Upper James portions. Most of this extensive urban development and industrial activity is concentrated at or below the fall line in Richmond, Petersburg, Hopewell and Hampton Roads.

As the demands on the river for drinking water and irrigation increase for urban and agricultural needs, accommodating everyone's needs and maintaining the health of the river becomes more difficult. The James continues to be stressed by a combination of pollutants, including nutrients, toxins and bacteria.

Balancing land-use and water needs of the human population takes careful planning for the future.

---

## Historical Significance

When Captain John Smith explored the James River in May of 1607 he was stopped by the *"great craggy stones in the midst of the river, where the water falleth so rudely, and with such a violence, as not any boat can pass."* Settlers, quick to recognize the potential power of the falls for flour mills, paper mills, and iron works, built the nation's first industries in Richmond. The city became a transportation center where goods were unloaded from oceangoing ships and taken farther inland by barge and eventually rail.

The James River was instrumental in bringing people westward. In the early 1700s a flat-bottomed boat known as the bateau was invented and the Kanawha canal, which spanned from Richmond to Botetourt County, was built to make travel and shipping on the river easier. A unique, flat-bottom boat, bateau were used to transport wheat, corn and other goods from the upper reaches to Richmond. By 1877 railroads built along the river replaced the hand poled bateaux and steam barges.



Virginia's first military arsenal during the Revolution was located strategically at Point of Fork, a natural "V" formed by the Rivanna and James Rivers. It was the principal depot for arms, the manufacture of gun powder and shot, bayonets, clothes and other items. It was also the training ground for Continental recruits. When the gun powder was removed from Williamsburg it was stated that "all the powder in the State is now at the Fork".

Although the arsenal was practically destroyed by the British, the need for army supplies in the western country was so great it quickly restored and maintained by the Commonwealth of Virginia. Daniel Boone was at the arsenal in December, 1791, and signed for powder and lead for use in his expeditions. George Rogers Clark also obtained supplies from here before it closed in 1801.

The James River at Henricus (near Chester) played an important role during the Civil War. In 1864, Richmond, the Confederate capital, was the focal point of the Union strategy. The fall of Richmond would end the war, and the river around Farrar's Island was thought to be the key to a safer, shorter route up the James River for Federal naval forces.

General Benjamin Butler devised a plan to build a canal and divert the river from Confederate cannons firing on the Union troops from Farrar's Island. The arduous construction was done by soldiers at Dutch Gap (mostly from black regiments) who faced continuous fire from Confederate sharpshooters and artillery with bullets whistling and shells exploding over their heads. These soldiers also succumbed to fever and disease requiring an ever-ready flow of replacements.

After the fall of Petersburg in April 1865 Confederate forces attempted to burn the High Bridge over the Appomattox River, a southern tributary of the James, in order to escape the pursuing Union Army. The capture of the bridge forced General Robert E. Lee's surrender at nearby Appomattox Court House, ending the war.

Today's kayakers and white water enthusiasts relish the falls of the James as some of the finest white water on the East Coast and the only white water which cuts through the heart of an urban area. Virginia's General Assembly has included the falls in the state scenic river system.

Along the lower tidal portions of the James more than a dozen colonial tobacco plantations still overlook this peaceful rolling river. Also along the lower James are the colonial capital at Williamsburg, the first permanent settlement of the British Empire at Jamestown, and 75 other registered historic landmarks. The Captain John Smith River trail recognizes 40 sites from Richmond to Tidewater that can be visited along the banks of the river. Given this wealth of the nation's past, it is no wonder that the portion of river flowing through Charles City, James City and Surry counties received Historic River designation from the General Assembly in 1988.

## Natural Features

In the midst of Hampton Roads and just upriver are the major seed oyster beds for the Chesapeake Bay. In the past 50 years approximately 75% of the seed planted on private leased land in Virginia came from the James River. Also this is where sooks, or female blue crabs, spawn from May to October and where they bury themselves in the mud for the winter. Landings of freshwater fish, such as shad and striped bass that spawn in the river and commercial harvests of market oysters have improved since the mid-1980s. Currently only 285 acres out of over 90,000 acres of commercially viable shellfish grounds in the James cannot produce marketable oysters.

The upper reaches or headwaters of the James have long been famous destinations for hunting, fishing and mineral springs. Native Americans would soak in the hot mineral waters at Warm Springs after hunts. Today vacationers still visit the mountainous resorts and national forests to recreate.

## Water Quality

Water quality in the James is much improved today than in times past. Today portions of the James River and its tributaries do not meet water quality standards for fecal bacteria, dissolved oxygen, benthic macroinvertebrates, PCBs and pH. The sources of fecal bacteria are agricultural run-off and poorly maintained sewage treatment plants. Low dissolved oxygen is caused by eutrophication from too many nutrients. Excessive sedimentation and nutrient loads reduce macroinvertebrate populations. Electrical transformers leak High levels of PCBs (polychlorinated biphenols) come from leaking electrical transformers and illegal dumping. High and low pH readings are related to algal blooms and acid deposition.

Virginia has taken significant steps to improve the water quality of the James over the years. The 1987 ban on phosphate laundry detergents has helped reduce the amount of phosphorous going into sewage treatment plants. Nutrient standards reduce the amount of phosphorous and nitrogen entering the James. Also the state has an ongoing program to identify “impairments” to water quality find their cause, and develop plans to clean up the pollutants entering the river.

The Commonwealth is also working to reduce agricultural nutrient runoff into the James by helping farmers install or adopt certain erosion and fertilizer management practices on their land. The state has also helped localities implement urban runoff control measures.

Overflows from combined sewers are another serious problem being addressed. In modern systems, sewage is carried to treatment plants by one system of pipes, while another carries storm water directly to the river. When wet weather hits older systems, the storm water creates high flows that are too great in volume and excess flows go straight into the river, carrying large quantities of raw sewage. In fact, during a large rainfall, Richmond’s combined sewers contribute more fecal bacteria than all of the other sources on the river combined. As a result whenever there is a large rain event, the oyster beds in the lower estuary must be closed due to fecal contamination.

Finally, toxic chemical pollution represents another threat to the James. In 1975, large quantities of Kepone, an extremely potent pesticide, were discharged into the river at Hopewell which led to a ban on commercial fishing in 98 miles of the James River from Richmond to the Hampton Roads Bridge Tunnel. The ban was lifted in 1989. Kepone is not gone. It has just become gradually buried by sediment, making it less accessible to fish and plant life. There is still some worry that a severe storm could stir up the sediments and the Kepone so the SWCB will continue measuring the Kepone levels in finfish and in the sediments.

Fish contamination from PCBs and mercury are other challenges the James River faces. The Virginia Department of Health issues advisories for fish consumption.

## Other Environmental Issues

To plan for future water needs, a coordinated statewide approach to water supply planning is under way. The Virginia Water Supply Plan assesses water supply conditions and demands across the state through the year 2030, data which localities need to make future water supply decisions.

Recent legislation has strengthened the state’s ability to assure that enough water is left in rivers to protect water quality, aquatic life, wildlife habitat, recreation and aesthetics. River flow is also a critical issue in one other respect. In the Richmond area, several dams along the James block the free flow of the river and prevent migratory fish, such as shad and striped bass, from reaching their historical spawning grounds further upstream. Two dams have been breached, two dams have been removed, five fishways have been installed, and one fish lift has been constructed to open over 200 miles of river upstream from Richmond for fish migration and spawning. This has been an important step for restoring fisheries in the Chesapeake Bay.

Local governments are also involved in the cleanup of the James River. As a result of the Chesapeake Bay Preservation Act, all Tidewater localities are incorporating water quality protection into their

planning. Citizen groups and coalitions such as the Elizabeth River Project, James River Association, Friends of Chesterfield's Riverfront, the Middle James Roundtable, James River Advisory Council, the Rivanna Conservation Society, and Friends of the Lower Appomattox are an important force in protecting the watershed.

Significant work has been done and money spent on improving and protecting the water quality of the James River. For the James to continue to be clean in the future, it will take a continued effort by the Commonwealth, local governments and James River citizens.

# Chickahominy River Watershed – Fact Sheet

**Location** It would take about two hours, including traveling both interstate and back roads, to drive the length of the Chickahominy River from its beginnings near the Wyndham subdivision in western Henrico County, to the mouth of the river where it empties into the James just upstream of Governor's Landing in James City County. The watershed (defined as the land area draining to the Chickahominy River) covers 261,000 acres which includes two large lakes (Chickahominy Lake and Little Creek Reservoir).

The drainage basin of the Chickahominy River begins north and west of Richmond in rural areas which are becoming more suburban. Headwater streams drain from West Broad Street and Glen Allen in Henrico County, and Elmont and the Town of Ashland in Hanover. Farther downstream the drainage basin includes areas on the north side of Richmond such as Lakeside, Bryan Park, and the Strawberry Hill area. Across the river is rapidly urbanizing Mechanicsville in Hanover County.

---

**Land Use** After winding through extensive wetlands, including dense and beautiful cypress swamps, the river becomes Chickahominy Lake, impounded at Walker's Dam to supply drinking water to the City of Newport News. Two other creeks in the Chickahominy watershed are impounded for Newport News drinking water: Little Creek and Diascund Creek. Because of the drinking water impoundments, the Chickahominy is afforded special water quality protection from point source, or end-of-pipe, discharges such as those from factories and municipal wastewater.

Compared to the upper one-third of the watershed, the middle and lower sections of the river have less residential development. Surrounding land includes some farmland and residential areas but forest is the predominant land use and timber harvesting is an important part of the local economy. Below Walker's Dam the river becomes tidal, flowing southward through thousands of acres of marsh and emptying into the James River.

---

**Historical Significance** The Chickahominy River is named after the Native American people who still inhabit the region. Chickahominy means "coarse pounded corn people." At the time of the earliest English settlement, the Chickahominy people existed surrounded by the powerful Powhatan confederacy of which they were not a part. It was members of the Chickahominy tribe who captured Captain John Smith of Jamestown when he was exploring the Chickahominy River. They turned Smith over to Chief Powhatan, whose daughter Pocahontas is said to have begged her father to spare Smith's life, beginning a friendship that enabled the survival of the English on this continent. Today, although they do not have a reservation, the Chickahominy tribe is the largest Native American tribe in Virginia with over a thousand members, and private land holdings in the Chickahominy watershed.

During the Civil War, the Chickahominy River dominated the planning and operations of both armies. In 1862 and 1864, the Chickahominy River swamps frustrated attempts by federal troops to capture the Confederate capital of Richmond. Early in the war, as federal troops were making their way from Hampton Roads toward Richmond, the Chickahominy River, its bridges flooded by spring rain, forced the federal army to split its forces isolating a regiment at the famous battle of Seven Pines. Upon assuming field command of the Confederate army, General Robert E. Lee immediately ordered his troops to start constructing extensive earth works in the central part of the Chickahominy watershed. Later in the war with Lee's and Grant's troops positioned just north of the River, worries over becoming mired in the Chickahominy's swamps influenced troop placement for the Battle of Cold Harbor. Again, elaborate fortifications were constructed.

Many of the trenches and mounds constructed by both armies survive today, located near Mechanicsville, along Beaverdam Creek, in Cold Harbor, and at Gaines Mill. Several of these historic battlefields are located both on private lands and in the Richmond National Battlefield Park.

---

## Natural Features

Teeming with fish, birds, and other wildlife, the Chickahominy River and associated wetlands draw thousands of hunters, fishermen, and other nature enthusiasts each year. The middle and lower sections are especially well-known to bass fishermen and duck hunters. Although the Chesapeake Bay region as a whole has experienced declines in duck populations, according to a former Game Department waterfowl surveyor, “the whole Chickahominy drainage is an excellent wood duck swamp, . . . from Lanexa to Route 5, it is excellent for mallards and good for black ducks and several others.”

Ospreys and the American bald eagle also nest along the shores and rookeries of tree-nesting egrets and great blue herons are found in the swamps. The Chickahominy River’s extensive wetlands and adjacent forest areas are important habitat to migrating songbirds on their extended north-south flights.

In the middle and lower sections of the watershed, large swampy areas, difficult to access, have been left undisturbed and are home to rare plant species such as swamp pink, yellow cowlily, and sensitive joint vetch. Even fresh water mussels, highly sensitive to environmental disturbance, are found in the tributaries to the Chickahominy. The rare glossy crayfish snake has been spotted along the River and, although most of the Chickahominy watershed has not been thoroughly surveyed, scientists suspect the habitat is right for other rare reptiles and amphibians as well.

Beavers are also very active in the watershed and are known to cause alterations to the water level and flow patterns of the river system by damming up and causing temporary flooding of new areas. Most likely, this has been part of the natural cycle of the river for thousands of years.

---

## Water Quality

Because the non-tidal portions of the Chickahominy provide drinking water to Newport News, the Chickahominy is afforded special water quality protection from point source, or end-of-pipe, discharges such as those from factories and municipal wastewater. Most of the Chickahominy river watershed is in good health although there are portions of Chickahominy Lake which do not meet state water quality standards for pH and dissolved oxygen.

Scientists think that natural causes could be leading to the deficiencies in pH and dissolved oxygen in Chickahominy Lake. Natural causes for pH can be attributed to the tannins that leach out of leaves which fall in the lake, while low dissolved oxygen is common in shallow lakes which do not experience seasonal ‘turning’ due to stratification.

---

## Other Environmental Issues

Changing land uses in the watershed of the Chickahominy result in a loss of wildlife habitat and an increase in nonpoint source pollution. Nonpoint source pollution includes runoff from urban streets, lawns, farm fields, construction sites, and timber harvests. The State Water Quality Assessment Report identifies two sub-watersheds of the Chickahominy in the top five percent for urban pollution potential in the state. These areas are in the upper part of the Chickahominy watershed in Henrico County. Excess nutrients and soil erosion are identified as the potential pollutants.

Land clearing activities related to building development or timbering also cause changes to and the loss of wetlands and other wildlife habitat. Different species of wildlife have different requirements for their living spaces or habitat. In some cases additional edge-of-field habitat may be created, benefitting some species while causing a loss of habitat for others.

Water withdrawals pose potential threats to certain Chickahominy watershed ecosystems. Increasing demands for drinking water from surface and ground water supplies may pose a threat to sensitive wetland systems if water levels change significantly.

Local governments throughout the watershed have programs to control some of the potential problems for the river created by land use changes. These include flood plain ordinances, stormwater management and erosion and sediment control programs. They also implement the Chesapeake Bay Preservation Act, which requires setbacks from streams to protect water quality. Some of these programs receive assistance from the local Soil and Water Conservation Districts (SWCDs). Colonial, Hanover-Caroline and Henricopolis are the three Soil and Water Conservation Districts which serve the Chickahominy watershed. The SWCDs also conduct programs to help farmers prevent pollution from farm runoff that can carry excess sediment, fertilizers, and pesticides into waterways. Water quality protection is also required for forestry activities to protect streams from the excess sediment during the construction of logging roads or from crossing streams to harvest trees.

A comprehensive effort is underway to document resource values of the Chickahominy and learn more about how the health of the Chickahominy wetlands and waterways are related to the surrounding land use. The U.S. Fish and Wildlife Service has teamed up with state and federal agencies and university researchers to study the effects of people and natural forces changing the landscape in the Chickahominy watershed. With existing information and new research, they hope to identify key areas to focus public and private conservation efforts.